

REMARKS

Claims 1-51 were presented for examination. Claims 1-51 were previously the subject of a Restriction Requirement dated October 17, 2008. However, Applicant filed a response on November 17, 2008 provisionally electing Group I covering Claims 1-23 and 25-51, drawn to a method of determining velocity and anellipticity parameters. Further, Applicant elected Species A (Figure 8a) which encompassed Claims 1-23 and 25-51.

In the present Action, the Office stated Applicant's election filed on November 17, 2008 is acknowledged. In the present Action, the Office noted that claims 15-19 and 36-40 are drawn to the PSTM correction of non-elected species B (Figure 8b) and not the CORR_{NMO} of elected Species A (Figure 8a), and that claims 15-19 and 36-40 were therefore withdrawn from consideration as they are drawn to a nonelected species. However, it is actually Claims 15-19, 24 and 36-39 that have been withdrawn from consideration.

Claims 1-14, 20-23, 25-35 and 40-51 stand rejected under 35 U.S.C. §101 because the claimed invention is directed to non-statutory subject matter. Further, the Office states that process claims 1-14, 20-23, 25-35 and 40-51 are not tied to a particular apparatus or machine and the claims do not transform a particular article to a different state or thing. The steps of the method claims are data processing steps that are not tied to any particular machine or apparatus and the data processing steps do not result in the transformation of a particular article to a different state or thing. In response, Applicant states the field of the invention is seismic prospecting. Independent claims are drawn to methods of processing seismic traces for extracting information about the geology of the subsoil.

Seismic traces are obtained by propagating seismic waves through the subsurface by means of seismic sources and picking up, by means of seismic sensors, signals resulting from reflections of seismic waves by the subsurface in the area being explored (see US2006/0291330, § [0003] and [0004]).

Seismic traces thus obtained relate to this specific subsurface area and bear information about the geometry and properties (that is the geology) of this subsurface area. This real-world information is present in the raw seismic dataset produced by the sensors, and processing methods such as the claimed methods improve the quality of the raw seismic dataset, especially by filtering out noise components, and allow outputs such as seismic maps to be extracted from the raw seismic dataset (see US2006/0291330, § [0003]).

What this implies is that seismic data in whatever form, including raw data as produced by sensors and processed data wherein noise components have been filtered out, are intrinsically technical, simply because they are real world data bearing information about the geology of the subsoil.

In order to eliminate unwanted noise components in the raw seismic data, and to obtain precise and reliable information about the geology of the subsoil, one conventionally implements Common MidPoint Gather (see US2006/0291330, § [0008] to [0014]). In this context, NMO correction is performed in order to compensate for the obliqueness of the various source-receptor paths (see US2006/0291330, § [0015] to [0017]).

In particular, an approach combining vertical heterogeneity and VTI anisotropy for performing NMO correction has proved to reflect most real cases (see US2006/0291330, § [0018] to [0033]). For performing this approach (anelliptic NMO correction), two parameters (V , η) have to be determined (see US2006/0291330, § [0045] and [0086]-[0087]).

In this context, the invention relates to a new determination of these parameters (V , η), so that anelliptic NMO correction can be applied to seismic traces in a common midpoint-gather, thus allowing for filtering out noise components in these seismic traces so that useful information about the geology of the subsoil can be clearly identified and interpreted. Therefore, claims 1-14, 20-23, 25-35 and 40-51 should be in allowable form.

For example, Claim 1, as amended, relates to a method of determining velocity V and anellipticity η parameters for processing seismic traces in a common midpoint (CMP) gather, and covers the various steps to be performed for the determination of velocity V and anellipticity η parameters, said parameters being converted into velocity $V(t_0)$ and anellipticity $\eta(t_0)$ laws for processing the seismic traces.

Applicant refers to a recent decision *In re Bernard L. Bilski*. As mentioned in decision *In re Bernard L. Bilski*, claims directed to a process that transforms a particular article into a different state or thing, are “surely patent-eligible” because such claims would not preempt all other uses. As affirmed by the CAFC in decision *In re Bernard L. Bilski*, a controlling factor of the “machine or transformation” test concerns the nature of the data which are processed (see page 25, section 2 to page 26). In particular, the court holds that a process is patent-eligible if the data represent physical and tangible objects.

In the case of the present invention, and as defined in amended claim 1, the data which are processed are seismic data and the output data of claim 1 are processing seismic data in view of the velocity $V(t_0)$ and anellipticity $\eta(t_0)$ laws.

As mention in claim 1, the entities which are processed are “seismic data” and not numerical data without physical meanings. Seismic data contain information about the specific properties and geometry of a physical subsurface area. The term “*seismic data*” used in amended claim 1 implicitly refers to this definition. Thus, the data which are processed are **physical and tangible entities**. Consequently, the method as defined in claim 1 relates to the processing of physical entities and cannot be considered as an abstract idea algorithm process.

Furthermore, the end result of claim 1 is the obtaintion of processed seismic data in view of the velocity $V(t_0)$ and anellepticity $\eta(t_0)$ laws.

As clearly shown in the application, the inventions allows for a static NMO correction to be implemented while processing the seismic data for filtering out noise components (see US2006/0291330 for instance § [0054] and [0055], § [0064] and [0065], § [0156] and [0157], § [0193], and § [0197]. In particular, when the static NMO correction is performed with the seismic traces processed according to the invention, the number of calculations is reduced and the stretching phenomenon is eliminated (see US2006/0291330 § [0054]).

The method claimed in amended claim 1 allows deriving, from recorded seismic data, velocity V and anellipticity η laws to perform processing including an NMO correction of the seismic traces of a CMP gather (see US2006/0291330 § [0087]). The seismic data are proposed using the velocity and anellipticity η laws. The processed seismic data obtained at the end of claim 1 are physical entities. Thus, the method claimed in claim 1 processes physical and tangible objects (i.e., seismic data) and allows transforming the physical and tangible objects into other physical and tangible objects (processed seismic data). Consequently, it is considered that claim 1 of the application in reference satisfies 35 U.S.C. §101.

In commenting on the references and in order to facilitate a better understanding of the differences that are expressed in the claims, certain details of distinction between same and the present invention have been mentioned, even though such differences do not appear in all of the claims. It is not intended by mentioning any such unclaimed distinctions to create any implied limitations in the claims. Not all of the distinctions between the prior art and applicant's present invention have been made by applicant. For the foregoing reasons, applicant reserves the right to submit additional evidence showing the distinction between applicant's invention to be unobvious in view of the prior art.

The foregoing remarks are intended to assist the Office in examining the application and in the course of explanation may employ shortened or more specific or variant descriptions of some of the claim language. Such descriptions are not intended to limit the scope of the claims; the actual claim language should be considered in each case. Furthermore, the remarks are not to be considered to be exhaustive of the facets of the invention which are rendered patentable, being only examples of certain advantageous features and differences which applicant's attorney chooses to mention at this time.

The Office is authorized to charge the petition fee and any other fees or credit any overpayment for this matter to the Deposit Account of Adams and Reese, LLP, Account No. 50-2413.

Reconsideration of the application as amended and allowance thereof is requested.

Please send all future correspondence regarding the above-referenced application to the undersigned at the address appearing below.

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The claims have been amended solely to eliminate multiple dependence, additional costs and complexity. Applicants believe this has broadened many claims and only repeated the same scope in several others. Consideration of the application as amended and allowance thereof is requested.

Please send all future correspondence regarding the above-referenced application to the undersigned at the address appearing below.

Respectfully submitted,

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Date

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